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Service and system enhancements for TDMA digital cellular systems

Austin, M. Buckley, A. Coursey, C. Hartman, P. Kobylinski, R. Majmundar, M. Rai J.P.

BellSouth Cellular Corp., Atlanta, GA, USA;

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Abstract

Throughout 1998, the TDMA community investigated and defined an enhanced suite of services for TIA/EIA-136 while also improving its basic system capabilities. These enhancements, named 136+, provide improved voice quality, increased capacity, higher data rates, and improved system engineering. The enhancements are obtained by introducing a new modulation and slot formats, and the addition of several new interleaving and coding options. As a result, the system supports a new vocoder mode, the GSM enhanced full-rate (US1) for improved fidelity at the IS-641 vocoder mode with a 4 dB BER enhancement on the IS-136 downlink, and a new channel capable of providing usable data rates of 14.4, 28.8, or 43.2 kbit/s on a full-rate, double full-rate channel, respectively. The packet data service is truly evolutionary in nature, having a new control layer with a network layer very similar to that used for the existing digital control channels, maximizes commonalities among TDMA technologies, using identical higher layers and the general packet radio service specified in GSM. Furthermore, by using a concept known as TIA/EIA-136 messages through the GPRS network elements, the existing features are maintained. This article provides an overview of these 136+ applications, as well as the improvements, such as the ability to support six voice users per 30 kHz (IDMA6), downlink fast power control.

Index Terms

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[136+](#) [14.4 kbit/s](#) [28.8 kbit/s](#) [4 dB](#) [43.2 kbit/s](#) [8-PSK](#) [BER enhancement](#) [\[US1\] vocoder mode](#) [SM enhanced full-rate \(US1\)](#) [TDMA digital cellular systems](#) [TDMA](#) [coding options](#) [data rates](#) [data services](#) [double full-rate channel](#) [downlink](#) [\[US1\] diversity](#) [enhanced capacity](#) [fast power control](#) [fidelity](#) [full-rate channel](#) [general packet radio service](#) [interleaving](#) [medium access control layer](#) [message passing](#) [multiple access scheme](#) [packet data service](#) [service enhancement](#) [slot formats](#) [system enhancements](#) [triple full-rate channel](#) [tunneling](#) [usable data rates](#) [vocoder mode](#) [voice quality](#) [services](#)

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